AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 Claim 1 (previously presented): A method of operating a
2 receiver apparatus to generate soft values from a set of complex
3 values communicated to said receiver apparatus, the method
4 comprising operating said apparatus to perform the steps of:
5   a) receiving a first set of complex values, said first set
6 of complex values being received complex symbol values obtained
7 from signals communicated over a channel;
8   b) receiving a set of soft bits, said soft bits
9 corresponding to said complex symbol values;
10   c) performing a complex multiplication operation on each of
11 at least some of said first set of complex values to generate at
12 least some elements of a second set of complex values, the
13 multiplication operation performed on each individual one of
14 said set of at least some of said first set of complex values
15 including multiplying said individual complex values by a
16 complex value determined from at least some of said soft bits;
17   d) summing said complex values in said second set of
18 complex values to generate a complex sum, said complex sum being
19 a complex value;
20   e) generating a third set of complex values, said third set
21 having the same number of elements as said first set of complex
22 values, by separately subtracting from said complex sum one of
23 said second set of complex values, each separate subtraction
24 generating one of said third set of complex values; and
25   f) multiplying each element of said first set of complex
26 values with the conjugate of a complex value from said third set
27 to generate a fourth set of complex values, said fourth set
28 having the same number of elements as the first and second sets,
29 said complex values in said fourth set being generated soft
30 symbol values.

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1 Claim 2 (original): The method of claim 1, wherein said received
2 set of soft values is generated from the output of a decoder.

1 Claim 3 (original): The method of claim 1, wherein said separate
2 subtractions performed in said step of generating a third set of
3 complex values are performed sequentially.

1 Claim 4 (original): The method of claim 1, wherein there are at
2 least two soft bits per received complex symbol value.

1 Claim 5 (original): The method of claim 1, wherein there are at
2 least 3 soft bits per received complex symbol value.

1 Claim 6 (original): The method of claim 1, wherein one of the
2 received complex symbol values is unmodified in phase by said
3 step of performing said complex multiplication operation on each
4 of at least some of said first set of complex values.

1 Claim 7 (original): The method of claim 6, wherein said complex
2 symbol value that is unmodified in phase occurs in a preselected
3 location within the first set of received complex symbol values.

1 Claim 8 (original): The method of claim 6, wherein for said
2 complex symbol value that is unmodified in phase, the
3 multiplication is known and independent of soft bits.

1 Claim 9 (original): The method of claim 6, wherein said complex
2 symbol value that is unmodified in phase is a pilot symbol
3 value.

1 Claim 10 (original): The method of claim 6, wherein said complex
2 symbol value that is unmodified in phase is a known symbol value
3 representing a pseudo pilot symbol.

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1   Claim 11 (original): The method of claim 1, further comprising:
2   performing a soft input soft output decoding operation on
3   said soft symbol values to generate additional soft bits.

1   Claim 12 (original): The method of claim 11, further comprising:
2   using said generated additional soft bits to process
3   another set of complex symbol values.

1   Claim 13 (original): The method of claim 11, wherein said soft
2   input soft output decoding operation is performed by a low
3   density parity check decoder.

1   Claim 14 (original): The method of claim 11, wherein said soft
2   input soft output decoding operation is performed by a turbo
3   decoder.

1   Claim 15 (original): The method of claim 1, wherein said first
2   set of complex symbol values are produced by an OFDM modulated
3   communications system.

1   Claim 16 (original): The method of claim 1, further comprising:
2   storing each of the generated second set of complex symbol
3   values for a predetermined time, said subtracting using symbol
4   values from said second set which have been stored for said
5   predetermined time.

1   Claim 17 (original): The method of claim 16, further comprising:
2   storing each of the first set of complex symbol values for
3   a second predetermined time, said second predetermined time
4   being longer than the first predetermined time; and
5   wherein said first complex symbol values multiplied with
6   said third complex symbol values have been delayed for said
7   second predetermined time.

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1   Claim 18 (original): The method of claim 5, wherein said complex

2   multiplication operation on each of at least some of said first

3   set of complex values is performed by performing no more than

4   two shift operations and no more than one addition operation.

1   Claim 19 (original): The method of claim 1, wherein the

2   communication signal is block-coherent communication signal.

1   Claim 20 (original): The method of claim 1, wherein one of the

2   received complex symbol values is modified in phase by said step

3   of performing said complex multiplication operation on each of

4   at least some of said first set of complex values by a fixed

5   preselected amount.

1   Claim 21 (original): The method of claim 20, wherein said

2   complex symbol value that is modified in phase by a fixed

3   preselected amount occurs in a preselected location within the

4   first set of received complex symbol values.

1   Claim 22 (original): The method of claim 20, wherein for said

2   complex symbol value that is modified in phase by a fixed

3   preselected amount, the multiplication is known and independent

4   of soft bits.

1   Claim 23 (previously presented): A apparatus for generating soft

2   values from a set of complex values, the apparatus comprising:

3   a first complex multiplier including:

4   i) a first input for receiving a first set of complex

5   values, said first set of complex values being

6   received complex symbol values obtained from signals

7   communicated over a channel;

8   ii) a second input for receiving a set of soft bits,

9   said soft bits corresponding to said complex symbol

10   values; and

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11   iii) circuitry for performing a complex multiplication
12   operation on each of at least some of said first set
13   of complex values to generate at least some elements
14   of a second set of complex values, the multiplication
15   operation performed on each individual one of said set
16   of at least some of said first set of complex values
17   including multiplying said individual complex values
18   by a complex value determined from at least some of
19   said soft bits;
20   a summer coupled to said first complex multiplier for
21 summing said complex values in said second set of complex values
22 to generate a complex sum, said complex sum being a complex
23 value;
24   means for generating a third set of complex values, said
25 third set having the same number of elements as said first set
26 of complex values, by separately subtracting from said complex
27 sum one of said second set of complex values, each separate
28 subtraction generating one of said third set of complex values;
29 and
30   means for multiplying each element of said first set of
31 complex values with the conjugate of a complex value from said
32 third set to generate a fourth set of complex values, said
33 fourth set having the same number of elements as the first and
34 second sets, said complex values in said fourth set being
35 generated soft symbol values.

1 Claim 24 (original): The apparatus of claim 23, further
2 comprising:
3   a decoder which generates soft output values, said decoder
4 being coupled to said first input of said first complex
5 multiplier.

1 Claim 25 (original): The apparatus claim 23, wherein said means
2 for generating a third set of complex values, includes a delay

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3   line for delaying complex values included in said second set of
4   complex values and a subtractor coupled to said delay line.

1   Claim 26 (original): The apparatus of claim 23, wherein there
2   are at least two soft bits per received complex symbol value.

1   Claim 27 (original): The apparatus of claim 23, wherein said
2   means for multiplying each element of said first set of complex
3   values with the conjugate of a complex value from said third set
4   to generate a fourth set of complex values includes:
5   a conjugate circuit; and
6   a second complex multiplier.

1   Claim 28 (new):   An apparatus comprising:
2   a processor for use in a receiver apparatus to generate
3   soft values from a set of complex values communicated to said
4   receiver apparatus, the processor configured to:
5   a) receive a first set of complex values, said first
6   set of complex values being received complex symbol values
7   obtained from signals communicated over a channel;
8   b) receive a set of soft bits, said soft bits
9   corresponding to said complex symbol values;
10   c) perform a complex multiplication operation on each
11   of at least some of said first set of complex values to generate
12   at least some elements of a second set of complex values, the
13   multiplication operation performed on each individual one of
14   said set of at least some of said first set of complex values
15   including multiplying said individual complex values by a
16   complex value determined from at least some of said soft bits;
17   d) sum said complex values in said second set of
18   complex values to generate a complex sum, said complex sum being
19   a complex value;
20   e) generate a third set of complex values, said third
21   set having the same number of elements as said first set of

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22 complex values, by separately subtracting from said complex sum

23 one of said second set of complex values, each separate

24 subtraction generating one of said third set of complex values;

25 and

26   f) multiply each element of said first set of complex

27 values with the conjugate of a complex value from said third set

28 to generate a fourth set of complex values, said fourth set

29 having the same number of elements as the first and second sets,

30 said complex values in said fourth set being generated soft

31 symbol values.

1 Claim 29 (new):   A computer readable medium embodying machine

2 executable instructions for controlling a receiver apparatus to

3 implement a method of generating soft values from a set of

4 complex values communicated to said receiver apparatus, the

5 method comprising operating said apparatus to perform the steps

6 of:

7   a) receiving a first set of complex values, said first set

8 of complex values being received complex symbol values obtained

9 from signals communicated over a channel;

10   b) receiving a set of soft bits, said soft bits

11 corresponding to said complex symbol values;

12   c) performing a complex multiplication operation on each of

13 at least some of said first set of complex values to generate at

14 least some elements of a second set of complex values, the

15 multiplication operation performed on each individual one of

16 said set of at least some of said first set of complex values

17 including multiplying said individual complex values by a

18 complex value determined from at least some of said soft bits;

19   d) summing said complex values in said second set of

20 complex values to generate a complex sum, said complex sum being

21 a complex value;

22   e) generating a third set of complex values, said third set

23 having the same number of elements as said first set of complex

24   values, by separately subtracting from said complex sum one of

25   said second set of complex values, each separate subtraction

26   generating one of said third set of complex values; and

27   f) multiplying each element of said first set of complex

28   values with the conjugate of a complex value from said third set

29   to generate a fourth set of complex values, said fourth set

30   having the same number of elements as the first and second sets,

31   said complex values in said fourth set being generated soft

32   symbol values.

1   Claim 30 (new): A apparatus for generating soft values from a

2   set of complex values, the apparatus comprising:

3   first complex multiplier means including:

4   i) first input means for receiving a first set of

5   complex values, said first set of complex values being

6   received complex symbol values obtained from signals

7   communicated over a channel;

8   ii) second input means for receiving a set of soft

9   bits, said soft bits corresponding to said complex

10   symbol values; and

11   iii) means for performing a complex multiplication

12   operation on each of at least some of said first set

13   of complex values to generate at least some elements

14   of a second set of complex values, the multiplication

15   operation performed on each individual one of said set

16   of at least some of said first set of complex values

17   including multiplying said individual complex values

18   by a complex value determined from at least some of

19   said soft bits;

20   summer means coupled to said first complex multiplier means

21   for summing said complex values in said second set of complex

22   values to generate a complex sum, said complex sum being a

23   complex value;

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24   means for generating a third set of complex values, said

25 third set having the same number of elements as said first set

26 of complex values, by separately subtracting from said complex

27 sum one of said second set of complex values, each separate

28 subtraction generating one of said third set of complex values;

29 and

30   means for multiplying each element of said first set of

31 complex values with the conjugate of a complex value from said

32 third set to generate a fourth set of complex values, said

33 fourth set having the same number of elements as the first and

34 second sets, said complex values in said fourth set being

35 generated soft symbol values.

1   Claim 31 (new): The apparatus of claim 30, further comprising:

2   decoder means which generates soft output values, said

3   decoder means being coupled to said first input means of said

4   first complex multiplier means.

1   Claim 32 (new): The apparatus of claim 30, wherein said means

2   for generating a third set of complex values, includes delay

3   line means for delaying complex values included in said second

4   set of complex values and subtractor means coupled to said delay

5   line means.

1   Claim 33 (new): The apparatus of claim 30, wherein there are at

2   least two soft bits per received complex symbol value.

1   Claim 34 (new): The apparatus of claim 30, wherein said means

2   for multiplying each element of said first set of complex values

3   with the conjugate of a complex value from said third set to

4   generate a fourth set of complex values includes:

5   conjugate means; and

6   second complex multiplier means.